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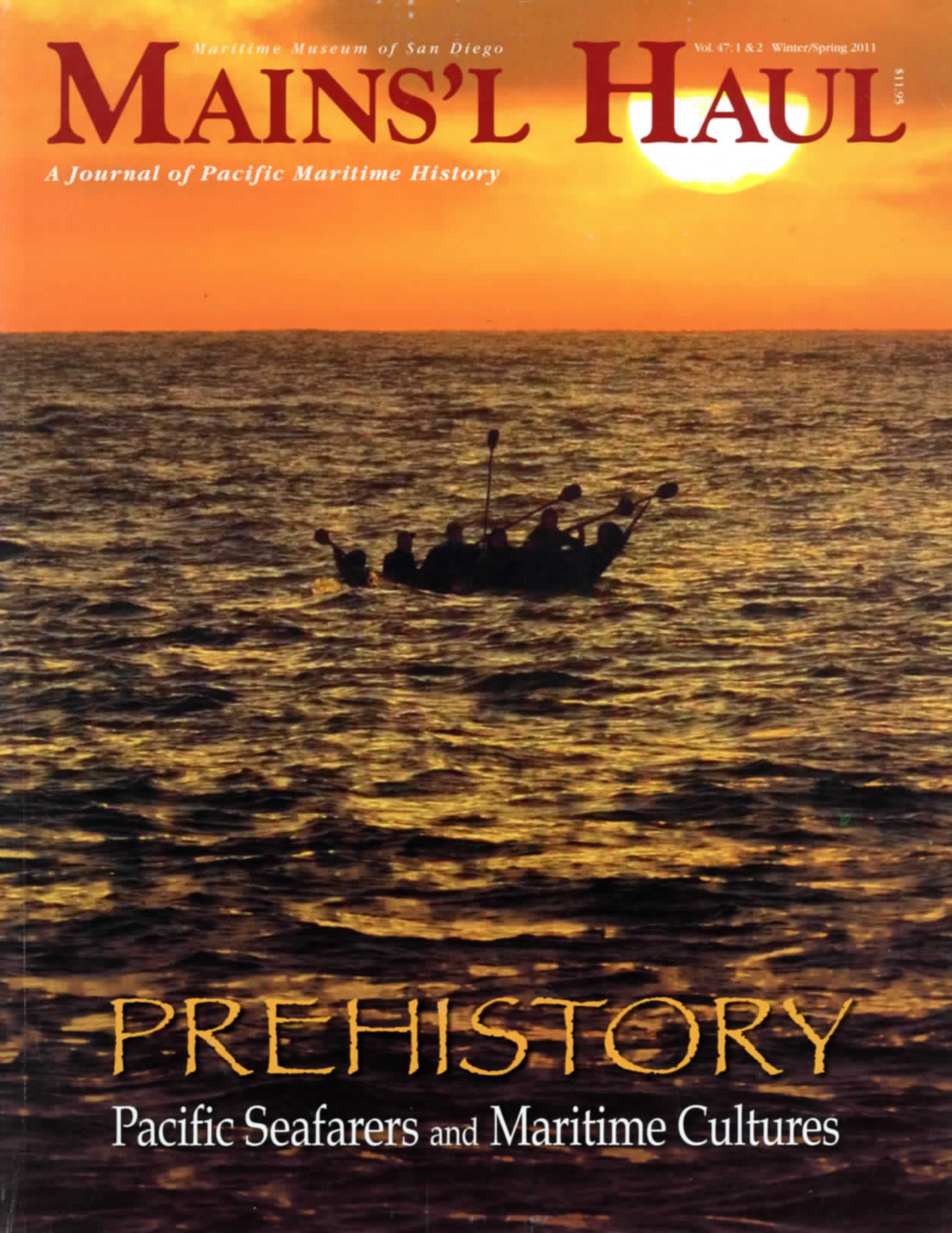


PREHISTORY

Pacific Seafarers and Maritime Cultures

Evidence of Prehistoric Native American Seafaring

by Jim Cassidy, Ph.D.

Introduction

Considerable debate has taken place regarding the possibility of multiple avenues of population expansion into the New World from Asia. In addition to traditional land-based models, a hypothesized role played by early seafarers has received greater attention and support in recent years. However, specifics as to the timing and characteristics of early seafaring activities have yet to be well developed.

Some time ago, Knut Fladmark (1978) argued for a maritime-based entry of people across the Bering Sea and southward along the coast of North America. However, this idea was generally rejected on both empirical and theoretical grounds. First, on empirical grounds, it was argued that there were few, if any, coastal sites that could be firmly dated to the late Pleistocene/early Holocene transition (approximately 12,000-9,000 years ago). At that time, the use of radiocarbon dating was only beginning to be systematically applied to the archaeological record and it was assumed that the few known coastal prehistoric sites all dated to recent times. However, during the last few decades a multitude of early sites have been confirmed in both coastal and insular settings that extend back to the end of the last Ice Age, around 10,000 years ago, and geographically span the entire northern Pacific Rim.

The second objection is based on a number of early theoretical assumptions. First, it has been argued that coastal marine resources such as shellfish and near-shore fish were only exploited late in prehistory after terrestrial resources began to fall short of the needs of an expanding land-based population (Chartkoff and Chartkoff 1984). Associated with this idea was the assumption that change took place gradually on a culture-wide basis after millennia of experimentation. Finally, the rationale for explaining why coastal adaptations evolved late in time, and in a gradual manner, was based on early ecological assumptions that marine resources were generally inferior in terms of caloric value and size (Yesner 1987). It was also assumed that hunting from a watercraft was far less efficient from a cost-benefit rate of return perspective when compared to hunting land mammals.

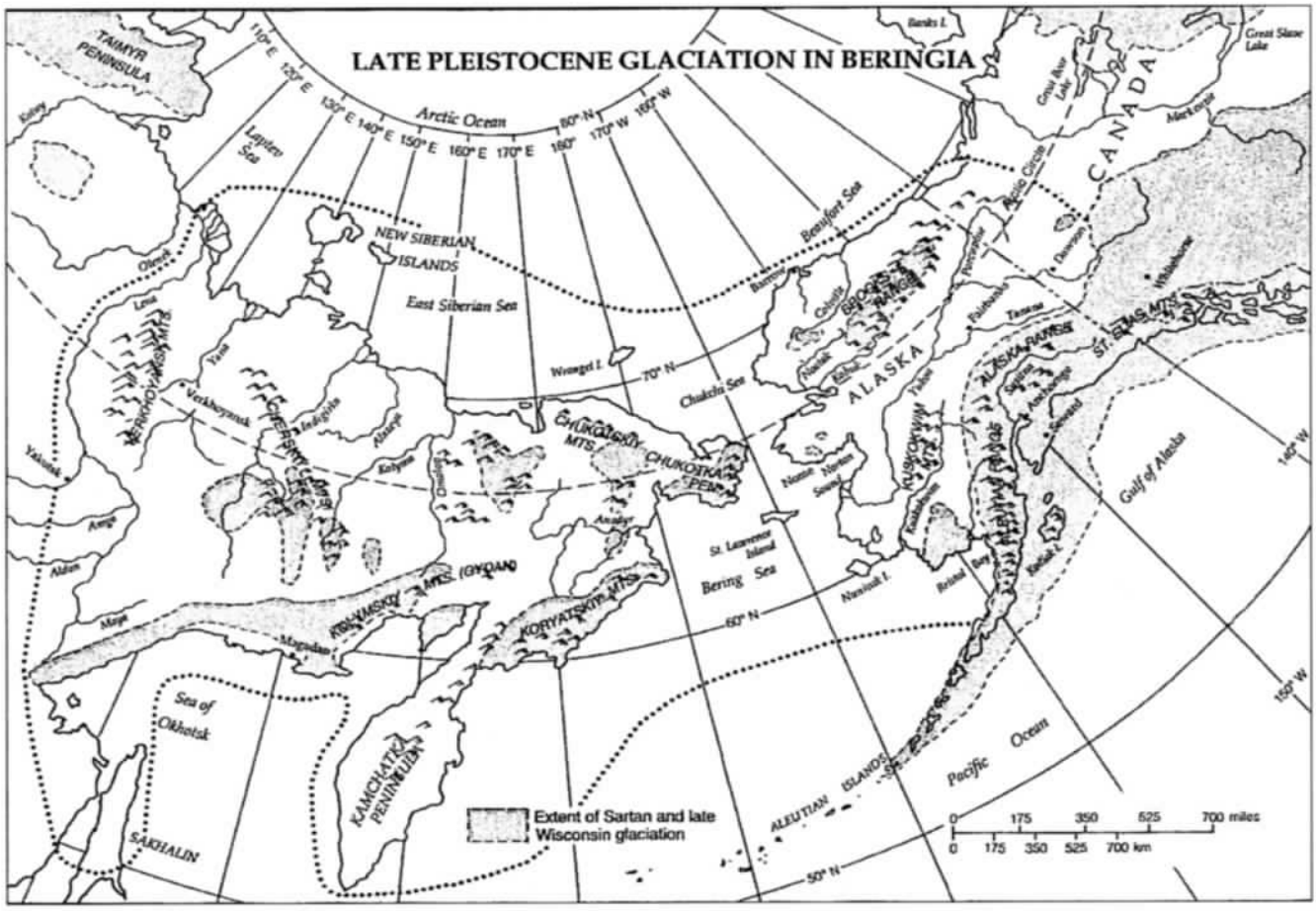
More recent research has brought all of these assumptions into question. It is now accepted that marine resources are fully comparable in nutritional value to those found on land (Erlandson and Colton 1991). Further, rather than acting as casual collectors of easily accessed coastal resources such as surf-fish and shellfish, early mariners were skilled hunters who actively targeted larger sea mammals, such as seals and even dolphins (Porcasi and Fujita 2000). More recent theoretical perspectives proposed by behavioral ecologists argue that individuals have always had the capacity to rapidly adapt to challenging conditions. This human ability to innovate during periods of heightened environmental stress is one of the hallmark characteristics of our specie and has been central to our ability to enter and expand throughout the entire breadth of the New World since the last Ice Age.

Evidence of Early Seafaring

In recent decades a significant number of coastal excavations in Alaska, the Northwest Coast, the California Coast, and even coastal South America, have yielded an ever-increasing number of radiocarbon dates that either coincide with or predate the Mammoth hunters of the Clovis Culture. In recent years the idea of a Paleo-Coastal tradition has been supported by the identification of more than a hundred southern California coastal sites that date to the terminal Pleistocene/early Holocene transition (12,000-8000 years BP).

Support for these ideas is drawn from evidence of late Pleistocene maritime migrations across temperate Pacific waters to Australia and New Guinea approximately 50,000 years ago (Groube et al. 1986;

Dr. Jim Cassidy's research has emphasized the prehistoric development of maritime cultures across the north Pacific Rim. This included study of mariners who resided on San Clemente Island over 8,000 years ago. He has conducted field research on the northern coast of the Sea of Japan and in the Russian Far East. This examined the transition of early mariners from hunter-gatherer-fishermen to Bronze Age complex societies in Northeast Asia. Dr. Cassidy has organized a number of international symposia and lectured on the unique evolution of maritime societies. He has published numerous articles, served as Scientific Editor for the journals *North Pacific Prehistory* and *California Archaeology*, and has recently co-authored a book entitled *California Maritime Archaeology: A San Clemente Island Perspective*. Jim is presently employed as an archaeologist with the Department of the Navy, and volunteers as a Research Associate for the Maritime Museum of San Diego



Late Pleistocene glaciation in Beringia (West 1996:3)

Roberts et al. 1990), Melanesia 35,000 years ago (Allen and Kershaw 1996), Okinawa 32,000 years ago (Matsu'ra 1996), and Japan 25,000 years ago (Oda 1990). It has been noted that if late Pleistocene cultures possessed the ability to use watercraft, then they could have leapfrogged along the Kuril and Aleutian Island chains of the arctic north Pacific and reach the New World prior to the Last Glacial Maximum 22,000 years ago (above). However, these ideas have not addressed the fact that there are presently very few archaeological sites known to exist above the 50-degree North Latitude in Europe, northern Siberia or the Americas at such an early date (Straus 2000; Workman and McCartney 1998; West 1996). In contrast to the paucity of support for the peopling on the America's prior to the Last Glacial Maximum, there is clearly a substantial amount of data emerging in support of the rapid spread of maritime adapted cultures all along the north Pacific Rim shortly after the Pleistocene/Holocene transition.

Sea level rise of almost 400-feet since the last Ice Age, with the resulting coastal erosion and silting in of all the river channels empting into the Pacific Ocean has resulted in the destruction of the vast majority of early coastal and island sites. In spite of this, the development of intensive surveys and the systematic application of radiocarbon dating techniques had identified many more early Holocene marine sites than previously thought possible. This has now led to a more optimistic view that many more are yet to be discovered. A number of early insular sites have already been found in the Gulf of Alaska, such as the Anangula site on Ananiuliak Island that dates to 10,000 years before present (Laughlin and Aigner 1966), Hidden Falls on Baranof Island dating to 9,500 years ago (Davis 1996), Ground Hog Bay on the Chilkat Peninsula at 9,200 years ago (Ackerman 1968), On Your Knees Cave on Prince of Wales Island at 9,200 years ago (Dixon 1999), and numerous sites on the Queen Charlotte Islands that date to between 9300-8300 BP (Fedje and Christensen 1999).

Numerous island sites dating to this time period have also been identified on the California Channel Islands. These include Daisy Cave on San Miguel Island that dates in excess of 12,000 calendar years (Erlandson et al. 1996), Arlington Springs on Santa Rosa Island at about 13,000 years BP (Johnson et al.1999), Punta Arena on Santa Cruz Island at 8,400 years age (Glassow 2005), and Eel Point on San Clemente Island that dates between 8,000 and 10,000 years ago (Cassidy et al. 2004; Raab et al. 1994). All of these sites date between 13,000 and 8,000 years before present and necessitated the use of watercraft to cross open bodies of water of up to 60 miles. Not only does this reflect a widespread distribution of insular maritime locations, but also demonstrates that these were not casual or short-lived occupations by unsophisticated mariners.

Seafaring vs. Littoral Environments

If we wish to propose the possibility of "maritime migrations," then a number of considerations must be addressed. First and foremost, a definition of what is meant by "maritime migration" must be agreed upon, and to my knowledge that has not been accomplished. Numerous treatises in the literature have explored the general concept of "migration" and associated processes involving the movement of populations into new and previously uninhabited areas (Anthony 1990; Beaton 1991). As Burmeister (2000) points out, however, the identification of migrations in the archaeological record, as opposed to other processes of culture change, is among the most difficult tasks we face.

However, in the case of insular island locations this task is made somewhat easier through the necessary assumption that "seafaring" (i.e. the use of watercraft) must have been involved. Thus, we may define "maritime migration" as the use of seafaring technology to occupy new coastal locations by people who primarily subsist on marine resources. This suggests that seafaring groups should represent a qualitatively distinct adaptation from coastal collectors who simply took advantage of easily accessed littoral resources. The ability to construct seaworthy watercraft, and pilot them in open-waters, presumes a significantly more complex mode of social organization and command of technology than that found among generalized land-based foragers (Kelly 1995). In order to evaluate these ideas we must address the technological challenges posed by open water conditions for the use of watercraft. Even today, to say nothing of during the Last Glacial Maximum, the challenges posed in northern latitude regions in the form of frigid temperatures, high precipitation, low visibility, high energy winds and related wave amplitudes, and forceful currents all pose life-threatening challenges for people involved in any proposed maritime passage.

A presumption that maritime migrations occurred across the north Pacific during the Pleistocene/Holocene transition requires us to consider what the marine environment must have been like at that time. First, we must recognize that the Bering Sea would not have existed at that time and that the Bering land bridge served to block the flow of frigid waters of the Beauford and East Siberian Seas from contact with the warmer north Pacific. This would have also served to significantly alter, and perhaps moderate, the flow of currents and seasonal storm patterns. Recent research, contrary to previous assumptions, have established that rather than being blocked by massive glaciers the north Pacific shoreline was lined with exposed peninsulas and islands that would have provided refuge for maritime adapted people (Dixon 1999; Fedje and Christensen 1999).

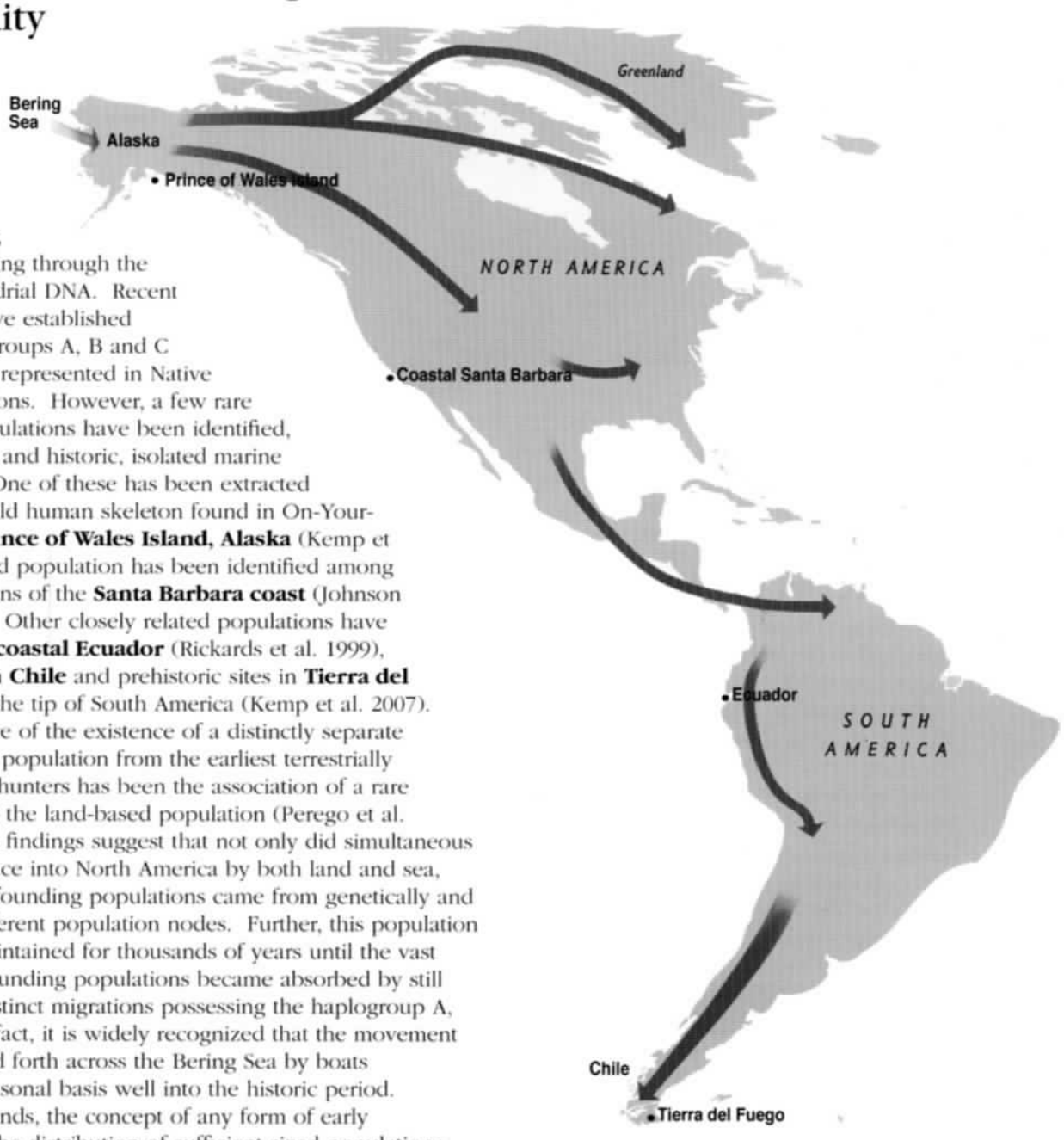
Conditions in the more temperate waters to the south would have been considerably less challenging, but still must have been taken seriously. If we accept that the long-term occupation of island sites required repeated seafaring ventures between the islands, and from the islands to the mainland, then it seems reasonable to assume that these hearty mariners possessed significant knowledge pertaining to the construction and operation of reliable watercraft, as well as the natural elements encountered during open water voyages.

Mitochondrial DNA and Reproductive Sustainability

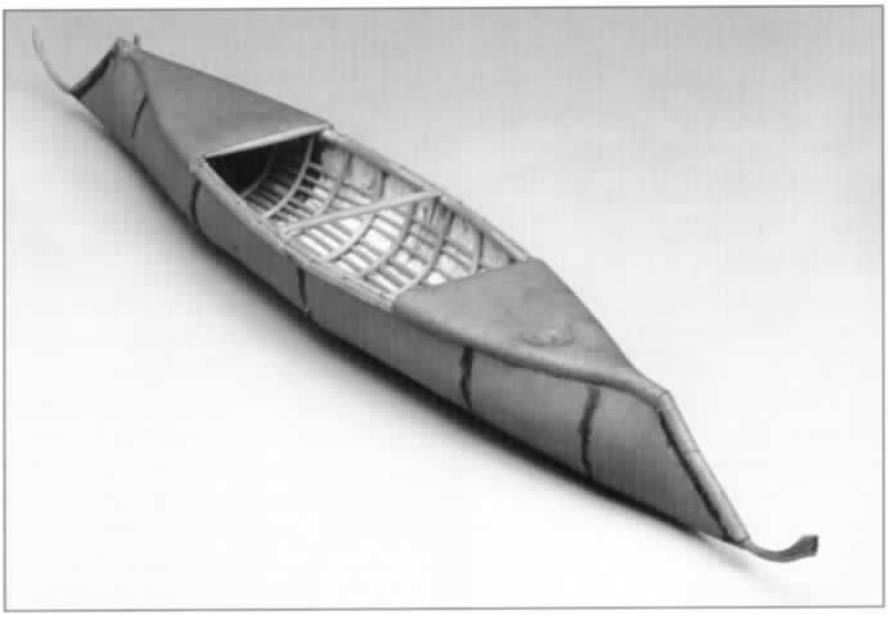
Proof of the existence of maritime populations, that were biologically distinct from terrestrial migrants, is presently emerging through the study of Mitochondrial DNA. Recent mtDNA studies have established that haplo blood groups A, B and C are predominately represented in Native American populations. However, a few rare haplogroup D populations have been identified, in both prehistoric and historic, isolated marine related contexts. One of these has been extracted from a 9200-year-old human skeleton found in On-Your-Knees-Cave on **Prince of Wales Island, Alaska** (Kemp et al. 2007). A second population has been identified among the Chumash Indians of the **Santa Barbara coast** (Johnson and Lorenz 2006). Other closely related populations have been identified in **coastal Ecuador** (Rickards et al. 1999), as well as southern **Chile** and prehistoric sites in **Tierra del Fuego**, located at the tip of South America (Kemp et al. 2007).

Further evidence of the existence of a distinctly separate founding maritime population from the earliest terrestrially adapted big-game hunters has been the association of a rare haplogroup X with the land-based population (Perego et al. 2009). All of these findings suggest that not only did simultaneous migrations take place into North America by both land and sea, but also that their founding populations came from genetically and geographically different population nodes. Further, this population separation was maintained for thousands of years until the vast majority of both founding populations became absorbed by still later genetically distinct migrations possessing the haplogroup A, B and C traits. In fact, it is widely recognized that the movement of people back and forth across the Bering Sea by boats continued on a seasonal basis well into the historic period.

On logical grounds, the concept of any form of early migration implies the distribution of sufficient sized populations to maintain reproductive viability, minimally defined as approximately 175 individuals (Birdsell 1968; Wobst 1974). Since the known terminal Pleistocene/early Holocene maritime sites ranged from small ephemeral artifact scatters to band-sized settlements it must be assumed that they were incapable of independently maintaining reproductive viability over the long span of time reflected by radiocarbon dates without regular contact with other groups. This means that the use of watercraft to visit other nearby groups for the purpose of social interaction and obtaining mates must have occurred on a regular and ongoing basis. This also suggests that the maritime populations viewed themselves as distinctly different and separate from the terrestrial populations and avoided inter-marriage between the two groups.



Above: Rare haplogroup D populations are identified in these geographic locations. (Arrows indicate path of prehistoric migrations.)



Left: The unique style of this "Sturgeon-Nose" bark canoe is thought to have originated along the Lower Amur River in the Russian Far East and spread to the North American Northwest Coast (Jennings 2004:107).

Native American Watercraft Technology

Obviously, if pre-8,000 year old watercraft were preserved in the archaeological record, then the reliance on indirect data for the reconstruction of seafaring would be unnecessary. However, in the absence of direct data, what can be inferred are the technological elements that would be necessary for watercraft design in order to sustain the prolonged occupation of insular locations. As discussed above, the design of such watercraft would necessarily need to address significant open-water challenges from storms, winds, waves and swells, currents, sea surface temperatures, and substantial distances between landfalls. These elements alone would eliminate the use of simple coastal crafts, such as rafts and dugout canoes as viable candidates, which are difficult to either steer or maintain upright in rough waters.

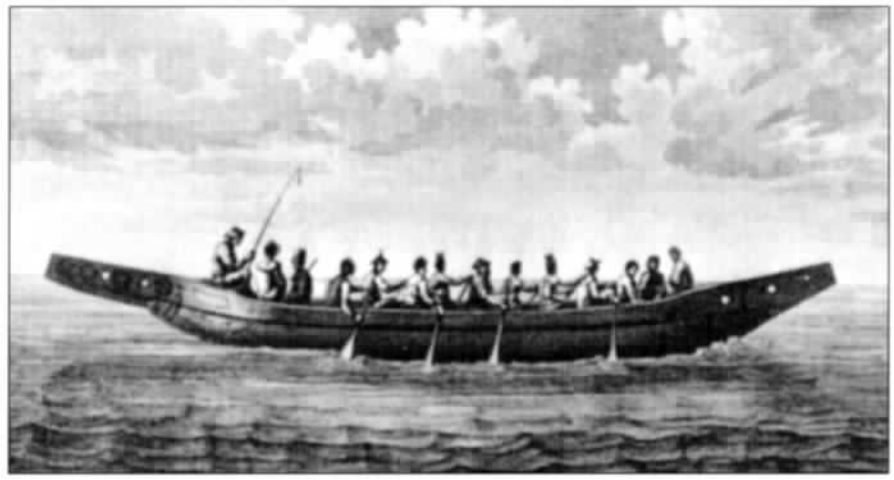
From a technological perspective, effective open-water watercraft must conform to very specific design requirements. Above all, watercraft must maintain buoyancy and stability. Buoyancy is achieved through the displacement of water with a near watertight hull, while craft stability is achieved through a relationship between buoyancy and the craft's center of gravity (Steffy 1994). Further, the displacement of water, minimization of wind drift, maintenance of directionality and the ability to cut through waves and maintain a relatively even plane all require a craft based on a modified "V" hull design. This generally implies the construction of a keel that runs along the bottom of the boat to provide both strength and flexibility. The bow, and the stern to a lesser degree, should be pointed and curved to increase the crafts hydrodynamics and speed. The gunnels should be sufficiently high to prevent swamping by waves, and must be separated from each other enough to permit the placement of crewmembers and cargo.

The manner in which watercraft developed in specific

Above Left: Walrus skin Umiak from western Alaska (Adney and Chapelle 1983;177).

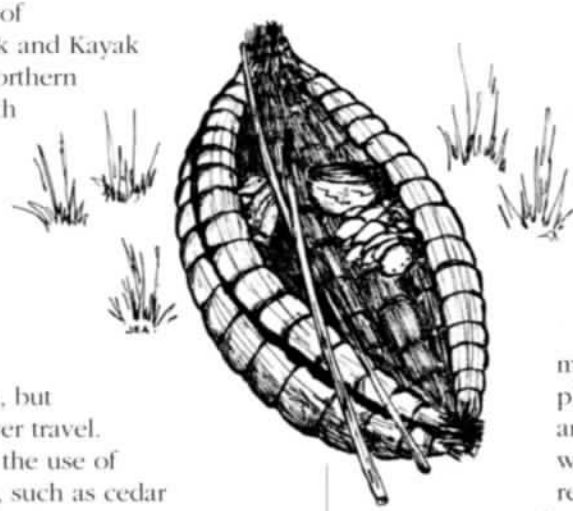
Left: Nunivak Island, Alaska Kayak (Adney and Chapelle 1983;199).

Right: Canoe seen by La Perouse in Lituya Bay on the Northwest Coast in 1786 (Emmons 1991:86).



locations would have been controlled by the geography, available resources and culture history of the craftsmen. The construction of bark canoes have been largely limited to locations where appropriate species of trees were available, such as birch, beach or spruce, and have been most effectively used in river locations (above).

The apparent association of skin boats, such as the Umiak and Kayak of North America, to frigid northern waters may be associated with the absence of trees and the abundance of sea mammal skins. The use of solubility animal fat as sealants may not have proved as effective in more temperate waters.



Left: Illustration of a five bundle balsa canoe utilized by the Chumash Indians of Santa Barbara, and Gabrielino Indians of the Los Angeles and Orange County coastal areas, California (Arnold 2001:14).

Most dugout canoes were of similar shape and size as bark or Kayak canoes, but restricted in use to calmer river travel. Oceangoing dugouts require the use of sufficiently large tree species, such as cedar or redwood that would permit the construction of high gunnels to avoid swamping by waves.

Balsa boats are directly associated with estuarial locations where long reeds are readily available. However, Balsas become saturated after a few days use and require frequent drying out periods and the repair or replacement of damaged reed bundles. The Chumash Indians of the Santa Barbara coast would construct three bundle crafts for estuaries and near coastal use, but would install additional bundles to form gunnels for travel to the nearby Channel Islands (Hudson and Blackburn 1979:335).

Finally, plank boats can be fabricated into composite structures wherever sufficient straight-grained woods free of knots, such as cedar and redwood, can be found. These materials could then be split into planks, bound together with twine, and caulked with asphalt to form watertight composite crafts. These represent the most complex form of watercraft constructed and used by Native Americans at the time of Spanish contact with Alta California. Plank canoes capable of holding from three to over twenty people were built by the Chumash and Gabrielino Indians to support various transport and commercial needs between the California mainland and the Channel Islands (McCawley 1996).

In addition to the availability of appropriate natural resources and technological know-how, the tools found in the archaeological assemblages of

Right: Photograph of the *Helek*, a replicated Chumash Indian plank canoe known as the *tomol* (McCawley 1996:124).

sites provide some clues pertaining to the types of watercraft construction activities that took place. The construction of bark canoes might be associated with wood cutting implements for stripping the bark from trees and punches to make the holes to lash the craft together. Skin boat construction should be associated with tools employed in the skinning, splitting and scraping of animal hides. Dugout canoes are commonly associated with the presence of axes and adzes for heavy woodwork. Reed boats may be accompanied with the presence of knives to cut the reeds and lashing materials. Plank canoes would necessitate the presence of wedges for splitting wood, scraper-planes, perforating implements, caulking chisels and abraders. While this list is by no means comprehensive, it illustrates how through a systematic examination of archaeological tool assemblages, accompanied with replication and use-wear experiments, we might advance our understanding of how and what types of watercraft were constructed in prehistory.

Conclusions

I have suggested that seafaring activities placed specific demands upon the dispersal of people from Northeast Asia, across what is now the Russian Far East and into the New World. These events and routes of migration would have placed very specific demands upon processes of social organization, group and individual knowledge, and technological skills. This, in turn, may have resulted in the development of qualitative differences between generalized terrestrial foragers who exploited easily accessed littoral resources and truly maritime people. These early seafarers possessed the ability to construct composite forms of watercraft, control sophisticated technological knowledge pertaining to boat construction, as well as the distribution of resources obtained through their use.

Anyone who has ventured upon the ocean knows that there is no such thing as simple seafaring. Unsupported assumptions of accidental strandings on islands, or that simple crafts such as rafts and dugout canoes could have sustained long-term occupations on distant islands amounts to "urban myths." On the contrary, the accumulating evidence reveals a pattern of widespread settlement of coastal and insular locations during the terminal Pleistocene/early Holocene transition. These highly mobile foragers were fully dependent upon the procurement of marine resources for survival, and commanded the technological skills to construct, maintain and pilot reliable watercraft in open waters on a regular basis. The late Pleistocene/early Holocene transition was a period of ameliorating climatic conditions and increasing resource abundance that provided great opportunities for accelerated processes of independent invention and related individual aggrandizement through increased mobility and the colonization of new territories.

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